

## Claims

WHAT IS CLAIMED IS:

1. - 17. (canceled)
18. (new) A fiber cassette comprising:
  - a housing that is delimited by two congruent base surfaces and at least one circumferential surface and has an interior having at least one cavity;
  - at least one layer of fibers arranged in the interior of the housing essentially parallel to at least one center plane of the housing, wherein ends of the fibers are anchored fixedly in the interior of the housing;
  - wherein a first one of the at least one cavity defines an outer compartment that surrounds the fibers externally;
  - wherein the at least one center plane does not intersect the base surfaces within the outer compartment;
  - wherein the fibers are arranged U-shaped or essentially parallel to one another and end within the interior of the housing;
  - wherein the housing has at least one opening for supplying and/or removing fluids.
19. (new) The fiber cassette according to claim 18, wherein the fibers are arranged in fiber bundles.
20. (new) The fiber cassette according to claim 18, wherein the fibers are hollow fibers.
21. (new) The fiber cassette according to claim 18, wherein the base surfaces

of the housing are polygonal or circular.

22. (new) The fiber cassette according to claim 18, wherein the fibers are comprised of different fiber materials and wherein the fibers comprised of different fiber materials are combined with one another in the fiber cassette.

23. (new) The fiber cassette according to 18, wherein at least one part of the fibers are hollow fibers or hollow fiber membranes.

24. (new) The fiber cassette according to claim 23, wherein the hollow fibers have open ends at least at one end of the hollow fibers and wherein a second one of the at least one cavity defines at least one additional inner compartment wherein the open ends of the hollow fibers are connected to the at least one additional inner compartment so that a substance exchange between the at least one inner compartment and the outer compartment is possible only through a material of the hollow fibers.

25. (new) The fiber cassette according to claim 18, wherein the housing comprises at least one large surface area opening that opens into the at least one cavity arranged in the interior, wherein the at least one large surface area opening comprises means for providing a fluid-tight connection to cavities of an additional fiber cassette or one or more covers to be connected to the fiber cassette.

26. (new) The fiber cassette according to claim 18, wherein the housing has channels for supplying or removing fluids to and from the at least one cavity.

27. (new) The fiber cassette according to claim 18, further comprising at least one cover connected to the housing, wherein at least one of the housing and the at least one cover is comprised of a material selected from the group consisting of flexible polymer,

rigid polymer, metal, glass, ceramic, and a light-transmitting material.

28. (new) The fiber cassette according to claim 18, further comprising at least one cover connected to the housing, wherein the at least one cover is comprised of a material that, after having been punctured, seals itself or is comprised of a semipermeable membrane or a filter fabric.

29. (new) The fiber cassette according to claim 18, further comprising at least one cover connected to the housing, wherein the at least one cover has at least one opening for supplying and/or removing fluids.

30. (new) The fiber cassette according to claim 29, wherein the at least one cover has at least one cavity that is connected to the at least one cavity of the housing.

31. (new) The fiber cassette according to claim 18, further comprising reagents immobilized on and/or in material of the fibers.

32. (new) The fiber cassette according to claim 31, wherein the reagents perform a task selected from the group consisting of binding substances or cells of the fluid and preventing a binding action of substances or cells of the fluid or are selected from the group consisting of chemical catalysts, biochemical catalysts, proteins, nucleic acids, complex compounds, and noble metals.

33. (new) The fiber cassette according to claim 18, containing particles that enable a substance-specific treatment of a fluid.

34. (new) A fiber cassette system comprised of at least two fiber cassettes that are fluid-tightly and fixedly or releasably connected to one another, wherein compartments of the at least two fiber cassettes are connected to one another across most of adjoining

surfaces of the at least two fiber cassettes or by an arrangement of pre-shaped connecting channels of the at least two fiber cassettes.

35. (new) The fiber cassette system according to claim 34, wherein at least two of the compartments of different cassettes are semipermeably connected to one another or are separated from one another by a cover.

36. (new) The fiber cassette system according to claim 34, further comprising a bottom plate, wherein at least two fiber cassettes form together with the bottom plate a common housing that comprises channels for supplying and/or removing media to the individual fiber cassettes.

37. (new) An arrangement of at least one fiber cassette according to claim 18 or a fiber cassette system according to claim 34 and a carrier, wherein the carrier has, for each fiber cassette or each fiber cassette system, devices for securing and for supplying and/or removing media to and from the individual cassettes.